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Probabilistic Risk Assessments (PRAs) are performed for projects or programs where the consequences of failure are highly undesirable. PRAs primarily address the level of risk those projects or programs posed during operations. PRAs are often developed after the design has been completed. Design and operational details used to develop models include approved and accepted design information regarding equipment, components, systems and failure data. This methodology basically validates the risk parameters of the project or system design.

For high risk or high dollar projects, using PRA methodologies during the design process provides new opportunities to influence the design early in the project life cycle to identify, eliminate or mitigate potential risks. Identifying risk drivers before the design has been set allows the design engineers to understand the inherent risk of their current design and consider potential risk mitigation changes. This can become an iterative process where the PRA model can be used to determine if the mitigation technique is effective in reducing risk. This can result in more efficient and cost effective design changes.

PRA methodology can be used to assess the risk of design alternatives and can demonstrate how major design changes or program modifications impact the overall program or project risk. PRA has been used for the last two decades to validate risk predictions and acceptability. Providing risk information which can positively influence final system and equipment design the PRA tool can also participate in design development, providing a safe and cost effective product.